CLAIMS

What I claim is:

1. A method for insitu minimization of infiltration and exfiltration of underground pipes comprising the following steps:
   a) forming an elastically coilable and radially expandable support having a diameter when in a relaxed state;
   b) coiling the support to a reduced diameter under tension;
   c) inserting the tensioned coiled support into an interior annulus of a pipe where a first inner surface of the pipe wall has a diameter smaller than the outer diameter of the support in a relaxed state;
   d) releasing the tension of the support when at a selected location; and
   e) expanding the outer diameter of the support to contact the inner surface of the pipe wall forming the interior pipe diameter.
2. The method of claim 1 further comprising the step of incorporating a thermally responsive material with the support.
3. The method of claim 2 further comprising the step of impregnating the support with the thermally responsive material.
4. The method of claim 1 comprising the step of incorporating a partially cured thermally responsive material.
5. The method of claim 4 further comprising the step of impregnating the support with the partially cured thermally responsive material.
6. The method of claim 1 further comprising the step of incorporating an electrical conductor with the support with separable connections to an electrical power source.
7. The invention of claim 6 wherein the material contains electrically conductive elongated components.
8. The method of claim 7 wherein the elongated components are carbon fibers.
9. The method of claim 1 further comprising constructing the support with electrically conductive material.

10. The method of claim 9 further comprising constructing the support with a metal.

11. The method of claim 1 further comprising heating the support after release of tension.

12. The method of claim 9 wherein the heat is created by electrical resistivity or impedance of the support.

13. The method of claim 2 further comprising the step of pressing the thermally reactive material into surficial voids and undulations of the first inner pipe wall after release of tension.

14. The method of claim 4 further comprising the step of pressing the partially cured chemical reactant into surficial voids and undulations of the first inner pipe wall after release of tension.

15. The method of claim 11 further comprising the step of curing the reactant and rigidizing the support to form a solid inner layer proximate to the first inner pipe wall.

16. The method of claim 1 further comprising the use of the injecting at least one chemical reactant into the ground to form a reaction product.

17. The method of claim 16 further comprising the step of creating a closed cell foam reaction product.

18. The method of claim 16 wherein the reaction product reduces spaces within the ground and between the ground and a second outer pipe wall surface.

19. The invention of claim 16 wherein the reactant is selected from a group consisting of a hybrid polyurethane or polyester/polyurethane blend resin, and epoxy resins combined with diluents, catalysts, blowing agents and surfactants, a acrylimide, and cementitous slurry.

20. The method of claim 16 wherein the radial expansion of the relaxed material minimizes the infiltration of the reactant and reaction product into the pipe.

21. A method for insitu minimization of infiltration and exfiltration of underground pipes having thickness between a first inner surface and a second outer surface comprising the following steps:

a. inserting into the pipe a heatable and radially expandable tensioned coil support containing thermal responsive material in communication with the ground surface;

b. releasing the tension to allow an outer surface of the support to press the to the first inner surface of the pipe;

c. Injecting a reactant into the ground; and

d. heating the coil to radiate heat through the thickness of the pipe to the ground proximate to the second outer surface.

22.The method of claim 21.further comprising radiating heat to create a reaction product of expanding close cell foam.

23. The method of claim 21 further comprising heating the ground proximate to the second outer surface of the pipe prior to insertion of the reactant.

24.The method of claim 21 further comprising rigidizing the thermal-responsive material while pressed to the first interior surface of the pipe.

25.The method of claim 23 further comprising shortening the cure time of the injected chemical reactant foam proximate to second outer surface is shortened.

26. The method of claim 21 further comprising removing the support after the rigidizing the thermal-responsive material.

27. The method of claim 26 further comprising the step of recoiling the support into a smaller diameter prior to removal from the pipe.

28.The method of claim 21 further comprising placing a radially inward tensioned support on the second outer pipe wall surface.

29.The method of claim 28 further comprising the injecting a thermally responsive material into the pipe wall between the radially inward tensioned support and the inner radially expandable tensioned support.

30.A method of repairing defects in the wall of a fluid conveying pipe comprising the steps of:

a. Impregnating a tensionable and expandable support with a chemical reactant;

b. tension winding the impregnated support to a reduce diameter while the reactant is in a partially cured state;

c. inserting the tension wound material into a interior annulus of a pipe having an interior diameter smaller than the expanding outer diameter of the tension wound material;

d. releasing the tension of the impregnated wound material when at a selected location proximate to the pipe defect;

e. expanding the outer diameter of the repair device to contact the inner surface of the pipe wall forming the interior pipe diameter; and

f. completing the cure of the impregnated chemical reactant.

31. The method of claim 30 comprising the further steps of:

a. using a heat responsive chemical reactant;

b. incorporating electrically conductive materials into the support;

c. attaching separable electrically conductive means to the support in communication with a electrical power source;

d. conducting electric current through the conductive material within the impregnated support to create heat;

e. using the heat to complete the cure of the chemical reactant; and

f. detaching the electric power connectors from the material.

32. The method of claim 30 where the chemical reactant is at a B stage at the time of insertion into the pipe.

33. The method of claim 30 where the chemical reactant is an ester.

34. A method of repairing defects in the wall of a fluid conveying pipe comprising the steps of:

a. Impregnating a chemical reactant into a tensionable and radially compressible coiled support with a annular diameter;

b. tension un-winding the impregnated support around an outer pipe wall having a larger diameter while the chemical reactant is in a partially cured state;

c. releasing the tension of the impregnated wound material when at a selected location proximate to the pipe defect; and

d. completing the cure of the chemical reactant after removing the tensioned force expanding the annular diameter of the support.

35. An internal pipe support apparatus for minimizing infiltration and exfiltration in underground pipes having interior diameter and a thickness between a first inner surface and a second outer surface and pipe connections comprising:

a. an elastic and radially coiled expandable support dimensioned to fit within an interior diameter of the underground pipe under coiled tension;

b. an electric heating source;

c. means to release the coil tension to allow an outer support surface to expand and circumferentially contact the first inner surface of the pipe; and

d. means to remotely provide electric current to the heating source.

36. The apparatus of claim 35 wherein the support material is the electrical heating source.

37. The apparatus of claim 35 wherein support contains elongated electrically conductive components.

38. The apparatus of claim 37 wherein the component is carbon fiber.

39. The apparatus of claim 37 wherein the support contains one or more heat responsive components.

40. The apparatus of claim 39 wherein heat responsive component contacts the inner pipe wall surface after tension release.

41. The apparatus of claim 39 wherein the heat responsive component is a thermoplastic material.

42. The apparatus of claim 39 wherein the heat responsive component is a thermosetting material.

43. The apparatus of claim 35 wherein the support is comprised of metal.

44. The apparatus of claim 35 wherein the support is comprised of resinous elastic material having a matrix memory capability.